

REMARKS

Claims 1-9 are pending. By this Amendment, claims 3 and 7 have been amended into independent form.

Applicant appreciates the indication of allowability for claims 3 and 7. However, for the reasons discussed below, all of claims 1-9 are allowable.

Claims 1, 2, 4 and 8 were rejected under 35 U.S.C. §103(a) over Kellam et al. (Kellam), U.S. Patent No. 6,025,767 in view of Rossi et al. (Rossi), U.S. Patent No. 6,247,485. The rejection is respectfully traversed.

Kellam and Rossi fail to disclose or suggest an integrated electromechanical microstructure comprising a base substrate and a cavity closed by a protective cover, microstructure comprising pressure adjusting means comprising at least one element made of pyrotechnic material, combustion whereof releases gas into the cavity so as to adjust the pressure in the cavity after the protective cover has been sealed, as recited in claim 1.

As admitted on page 2 of the Office Action, Kellman fails to disclose a pressure adjusting means. In fact, Kellman is precisely the art that suffers deficiencies as identified by Applicant's specification in which claim 1 overcomes.

Kellman discloses a micro-relay module 10 wherein gas is contained in a chamber 14 at a gas pressure which is above atmospheric pressure (col. 3, lines 63-64). A plurality of relays may be formed within the chamber 14, or one or more relays and other MEMS devices may be formed within the chamber 14 (col. 3, lines 60-63). As shown in Figs 3A and 3B, three modules 10a, 10b and 10c may be formed simultaneously (col. 5, lines 25-30) with a high pressure reflow performed to encapsulate gases in the chambers (col. 6, lines 26-35).

Kellman thus provides the same method of manufacturing as described on page 1, line 26 to page 2, line 5 of Applicant's specification. In particular, both disclose that all cavities of an array of MEMS that are formed on a same substrate are encapsulated simultaneously in a

gas atmosphere so that all cavities are thereafter at a pressure above atmospheric pressure. Kellman fails to provide any other disclosure or suggestion as to how gas within a cavity is placed at a pressure that is above atmospheric pressure.

Rossi discloses a miniature valve that fills a reservoir for the administration of medicine. As shown in Fig. 6, a sachet 14 and a reservoir 10 are fixed to opposite sides of a flexible film 15 (col. 5, lines 51-53). A first valve 16 is fixed to the film 15, like the valve from Figs. 4 and 5, and a plurality of other valves 17, like the valve from Figs. 2 and 3, around the valve 16 (col. 5, lines 53-58). A flexible envelope 18 is welded to the film 15 with the valves 17 clamping the envelope 18 against the film 15 (col. 5, lines 58-62).

When actuated, the gases generated by the combustion of the charge of the valves 17 open a passage through the burst thinner area of a valve and a coaxial hole is pierced in the film 15 while the gases generated by the combustion of the charge of the valve 16 inflate the envelope 18 (col. 6, lines 1-7) in order to expel fluid 19 through the passage created by the valves 17 (col. 6, lines 7-13). In other words, thinner areas of at least two valves 16, 17 rupture due to the pressure of the gas generated by the combustion of a pyrotechnic charge as shown in Figs. 3 and 5.

Although Rossi uses a pyrotechnic charge, the pyrotechnic charge as applied by Rossi can not be applied to the module 10 of Kellman. Rossi applies a sufficient amount of a pyrotechnic charge in order to burst the thinner area of a valve. Rossi fails to provide any disclosure with regard to using a pyrotechnic charge that does not burst a valve because such use would prevent fluid 19 from being administered. If the same pyrotechnic charge as used by Rossi is applied to Kellman, a sufficient amount of a pyrotechnic charge would then be applied in order to burst either the rigid substrate 11, lid 12 or solder ring 13. As such, the cavity 14 in Kellman would not be placed at a pressure that is above atmospheric pressure.

No where is it disclosed or suggested in either Kellman or Rossi to apply a pyrotechnic charge in order to adjust the pressure within a chamber or cavity.

Kellman and Rossi also fails to discuss the problems that are presented and solved by claim 1. Kellman fails to provide any disclosure or suggestion with regard to individually controlling the pressure inside MEM cavities. Conversely, Kellman only discloses simultaneous fabrication and sealing of a great number of MEMS having cavities which are of the same pressure defined during sealing thereof. Rossi at most suggests using a gas created by the combustion of an element made of pyrotechnic material in order to inflate a flexible envelope 18 or for breaking a thin area of a solid substrate in order to expel a fluid through passages formed in the valves. Kellman and Rossi fail to provide any disclosure of suggestion with regard to individually controlling the pressure in the cavity of a microstructure after sealing thereof. At most, the combination of Kellman and Rossi only suggest the breaking of a solid substrate an/or to make flexible one of the walls of a cavity in Kellman in order to implant therein a micro-valve for the passage of a fluid.

Accordingly, the combination of Kellam and Rossi fails to disclose or suggest all of the features recited in claim 1, or the additional features recited in the dependent claims. It is respectfully requested the rejection be withdrawn.

Claim 9 was rejected under 35 U.S.C. §103(a) over Kellam in view of Rossi, and further in view of Giust et al. (Giust), U.S. Patent No. 6,413,848. The rejection is respectfully traversed.

Giust fails to overcome the deficiencies of Kellam and Rossi because Giust fails to provide any disclosure with regard to using a pyrotechnic charge to adjust the pressure in a cavity. Accordingly, the combination of Kellam, Rossi and Giust fails to disclose or suggest all of the features recited in claim 1, as well as the additional features recited in claim 9. It is respectfully requested the rejection be withdrawn.

In view of the foregoing, it is respectfully submitted that this application is in condition for allowance. Favorable reconsideration and prompt allowance of claims 1-9 are earnestly solicited.

Should the Examiner believe that anything further would be desirable in order to place this application in even better condition for allowance, the Examiner is invited to contact the undersigned at the telephone number set forth below.

Respectfully submitted,



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